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ABSTRACT

This study compared the inclusive PIER program (French acronym for program intervention with at risk students), which was implemented in 13 third grade classes in Quebec (Canada) and compared with 13 third grade classes using a traditional resource room pull-out program over the course of a full school year. A total of 165 at-risk and 441 non at-risk students participated. The PIER program emphasizes four components: (1) collaborative consultation; (2) cooperative teaching; (3) parent involvement; and (4) strategic and adapted instruction in reading, writing, and mathematics. Three achievement tests and five affective tests were administered in September and the following June. On the academic tests, the at-risk students in the PIER settings had significantly higher scores in writing and similar scores in reading and mathematics, compared to students in resource room pull-out programs. Regular students in the PIER settings had significantly higher scores in both reading and mathematics compared to control group students. On the affective measures, student attitudes toward school became more positive in the PIER settings. On no measures did students in the PIER setting (either at-risk or regular) perform less well than students in the traditional pull-out setting. Separate analysis of students with learning disabilities found the PIER program resulted in higher (but not statistically significant) achievement in mathematics and writing and more positive attitudes toward school. (DB)

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PIER:

An Inclusive Model for At-Risk Students

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Abstract

The conference aimed to present the results of a research evaluating the impact of an inclusive model for at-risk students. Experimented during one school year in 13 third-year classes, its efficacy was compared to a control group constituted of 13 third-year classes using a pull-out model with traditional resource classes. Achievement and affectives measures were taken at pre-and posttest. Results revealed that at-risk students in the experimental group were superior to the control group on the spelling/writing test. No statistical difference was found in reading and mathematics. Regular students in the experimental group were superior to the control group in mathematics. Analysis of results on affective measures revealed some advantages of the pull-in model on attitudes toward school and children's loneliness. No difference was found on perception of abilities and control locus.

INTRODUCTION

During the last two decades, the resource classroom has been the main type of service for special students in the United States as well as in Canada. However, it has been criticized on several aspects:

- stigmatizing effect on the students pulled out of the regular classroom;
- waste of instruction time delivered in the regular classroom;
- absence of generalization of the abilities and behaviors learned in the resource classroom;
- lack of coherence and collaboration between the regular classroom teacher and the special education teacher as to the instruction, content, materials and terminology;
- the frequent transitions from the two frameworks (resource and regular classrooms) have a distracting effect on special students and can also be detrimental to the normal functioning of the class.

In a context where there is a lot of dissatisfaction with special education delivered in resource classrooms, the idea of having integrated special education services was developed in the last years.

Various advantages have been linked with total integration programs in which service delivery takes place in the regular classroom:

- better coherence and collaboration between the regular and special education teacher;
- improved self-esteem in special students;
- more positive social relations;
- an increased motivation toward school.

Hence, recent trends in education show an increasing interest in service delivery in the regular classroom for special students.

Three recent studies compared pull-out and integrated educational services:

- Jenkins, Jewell, Leicester, O'Connor, Jenkins, and Troutner (1994)
- Welch, Richards, Okada, Richards, and Prescott (1995)
- Stevens and Slavin (1995)

These three comparative studies reveal that mainstreamed services are somewhat superior to the traditional resource settings. The programs being multifaceted, it is difficult to determine which component has more impact and to compare one study with another.

These studies have common program components such as:

- collaboration between the special education and regular teacher;
- teaching learning strategies;
- cooperative learning.

In some cases, the resource classroom coexists with mainstreamed services, in others the special education teacher works in the regular classroom, and elsewhere the special education teacher only plays a consultant role.

OBJECTIVE

Even though total integration models in the regular classroom are being more and more recommended for students at risk for school failure, very few studies have attempted so far to assess their effects in comparison with the traditional pull-out model. This conference presents the results of a study conducted to assess the impact of an innovative educational approach for students at educational risk called PIER (*Programme d'intervention auprès des élèves à risque*).

PIER integrates the best practices proposed in the last few years of research in education, special education and in teaching reading, writing and mathematics.

PIER PROGRAM

In PIER, all the students received instruction in the regular classroom. The program comprises four components (see figure 1):

1) Collaborative consultation

2) Cooperative teaching

3) Parent involvement

4) Strategic and adapted instruction in reading, writing and mathematics.

Collaborative Consultation

In the PIER program, the regular and special teacher met every week for 60 minutes. That period of time allowed both teachers to determine which goals were important for each student at risk, to analyze their observations together and to share responsibilities.

That meeting also allowed them to jointly plan instruction periods (for a total of 90 minutes/week) they taught together in the same classroom as well as other instruction periods taught by the regular teacher alone during that week.

Cooperative Teaching

The special teacher spent 30 to 45 minutes two to three times per week co-teaching with the classroom teacher.

Co-teaching provided opportunities for small-group instruction that were more explicit, more closely monitored, and more strategic than was possible with only one teacher in the classroom.

The special teacher intervened with all students.

The tasks to be accomplished by each teacher are determined according to their competencies and their own abilities and not according to the type of student (regular or at-risk) or according to prescribed roles.

Family Involvement

The PIER encouraged parents' collaboration with the school. Various suggestions were provided to teachers for an effective communication with parents, and particularly with the parents of students at educational risk.

The teachers maintained a regular contact with parents through regularly scheduled teacher-parent conferences, IEP (Individualized Education Programs) meetings and through written communication.

The parents were encouraged to monitor their child's educational progress at home. They were also presented with the teacher's expectations concerning homework, and the parents' role to support their child's achievement.

Parents of special students received a document on individual educational plan and how to prepare themselves for the meeting.

Strategic and Adapted Instruction

In the PIER, the goals of instruction are that each student becomes cognitively active and acquires more adequate cognitive and metacognitive strategies. Strategies were taught by scaffolding. To do so, certain types of intervention are favored:

- explanation of the strategy and its utility;
- modeling;
- interaction between the teacher and the students or dialogue on strategies;
- interaction among students;
- frequent reviews of the strategies during various activities taking place in class.

The dialogue between students was facilitated by using cooperative learning and peer tutoring. Large group activities were mostly used at the beginning of the lesson

for new concepts or strategies, and at the end of the lesson for a synthesis or mapping. Individual work was used to internalize knowledge.

The evaluation was continuous, multidimensional and interactive. The use of a portfolio facilitated the evaluation process with students at educational risk.

For each domain, the main components of instruction were the following:

Reading

1. *Creating a positive attitude toward reading* : providing a wide variety of children's literature, scheduling a daily reading period to the students and a period where they read silently, promoting reading at home.

2. *Teaching reading strategies* : generating a framework to monitor reading understanding, determining the meaning of information words, instructing students about the text structure, instructing students on how to answer comprehension questions.

3. *Before reading* : setting the purpose of the reading activity, activating and organizing relevant background knowledge, implementing direct instruction in vocabulary and concept.

4. *During reading* : instructing students to make predictions, helping them to make a link between parts of the text and a link with prior knowledge, leading students through the process of identifying the main idea and the supporting details, guiding them to monitor comprehension, summarizing parts of the text.

5. *After reading* : verification of the reading purpose, reaction to the text, recall, questioning for main ideas, discussion on the text.

Writing

1. *Creating a positive attitude toward writing* : scheduling free writing periods, being a model writer, sharing interest toward writing, creating a risk-free environment

in which students are not afraid to take risks and to make mistakes, providing positive feedback, scheduling at least one writing activity per week, diffusing to real reader.

2. *Teaching writing strategies with different types of texts* : narrative, poetic, informative, expressive, taking advantage of different situations to write on any academic subjects, creating real and meaningful writing activities.

3. *During prewriting* : presenting the form, purpose and audience, brainstorming ideas for topics, organizing ideas by making a web or an outline.

4. *During drafting and revising* : asking questions continuously on type of text, reader, clarity of the message, choice of words, sentence structure, spelling, making suggestions for reformulation or for using a revision checklist and writing tools, using peer feedback.

5. *Intervention after writing* : planning intervention to reinforce strengths and to remedy the weaknesses.

Mathematics

1. *Creating a positive attitude toward mathematics* : insisting on math activities and on understanding more than rote learning, providing a rich bank of problems and a class book of problems with different solutions found by students, scheduling a daily period for problem solving, positive feedback, creating a risk-free environment.

2. *Teaching problem solving strategies with different types of problems* : realistic, fantasist, only mathematical, requiring different strategies (using materials, drawing a table or a draft, making an equation, looking for regularity, trial and error, checking for many possibilities, choosing one of several operations).

3. *Activities before problem solving* : instructing students with an illustration, drawing or materials so that they understand the problem.

4. *Activities during problem solving* : encouraging the students to write on their sheet, to consult the class book, to work in team, to manipulate and to use a calculator.

5. *Activities after problem solving* : distinguishing between problem solving and communicating a solution, using different means of communication (individual writing, demonstration or oral presentation in small or large group).

METHOD

Subjects and Design

A total of 606 French-Canadian third-grade students, 284 girls and 322 boys, from 26 schools (one regular class per school) participated in the study.

Grade 3 level was chosen for this study since it constitutes a critical year in the school life.

Schools were located in the two main urban areas of the province of Quebec (Montrèal and Quebec City) and their surrounding rural districts.

Classes having answered the invitation to participate in the project were divided in three socioeconomic categories according to the classification of the Provincial Department of Education. Attribution of the classes to the group was made with the method of stratified sampling on SES variable. A total of 276 students came form high SES schools, 148 from middle SES schools, and 182 low SES schools.

The sample was divided into two "Student Types": 165 at-risk and 441 non at-risk students (average and high achievers). Four criteria have been used in identifying students at risk for failure or dropout:

(a) low achievement in academic test in reading, writing and mathematics;

(b) identification of special students by a multidisciplinary team (MDT);

(c) teachers' ratings;

(d) grade retention.

The student must meet one or more criteria to obtain the at-risk status.

To examine treatment effects, we employed a 2 [Groups (*treatment classes, comparison classes*)] x 2 [Student Types (*at educational risk, regular*)] quasi-experimental research design with pretest and post-test measures.

Implementation of the Program

The experiment was conducted during the 1993-1994 school year.

For each selected class, the school's principal and the director of the district board signed an agreement with the faculty stipulating that for this school year, the special students will receive services exclusively into the regular class and that special and regular teachers involved in the project will be discharged for training and supervision.

The participants have undergone 5 days of training at the beginning of the year, given seperately in both regions. In addition, three booster sessions have been given during the year (November, February and May).

Parents have consented to allow their children to be evaluated at the beginning and end of the year.

The teacher/special education teacher team was supervised every two weeks by a research professional associated with the project throughout the year of the study.

Measures

Achievement and affective variables were measured in September (pretest) and in June (post-test).

Three achievement tests

Achievement test consisted of tests in reading, writing, and mathematics provided by the Provincial Department of Education at the end of Grade 3.

These tests were group-administered by the teachers at the same time all across the province. Teachers had to comply with a standard procedure of administration provided with each test.

Five affective tests (group-administered)

- Self-concept was measured using a French version of the Perception of Ability Scale for Students (PASS) (Boersma & Chapman, 1992).
- Perception of locus of control was measured using a French version of the Intellectual Achievement Responsibility (IAR) (Short form) (Crandall, Katkovsky, & Crandall, 1965).
- Attitudes toward school were assessed by using The Attitude Toward School Scale (*Échelle d'attitudes envers l'école*) (Daigle, 1994).
- Loneliness was assessed by using the instrument developed by Asher, Hymel, and Renshaw (1984).
- The social relations measure was taken at post-test only. The students were asked to list in order of importance, the name of three of their favorite friends in the classroom in respectively three situations: school work in the classroom, playtime at school, invitation to a party at home. A global sociometric score was calculated for each students and transformed into a standardized score per class.

RESULTS

To evaluate the effect of the program, two MANCOVAs were conducted. The pretest scores on each variable served as covariable. Table 1 shows means, standard deviations and adjusted means for academic and affective variables.

Academic Scores

A 2 (Group) x 2 (Student Type) multivariate analysis of covariance (MANCOVA) performed on academic scores revealed a significant effect for Group x Student Type interaction, [F (3, 511) = 7.03, p < .001, Wilks's lambda = .96].

Simple-effect tests revealed that:

At-risk students

Writing:	Experimental > Comparison
Reading:	Experimental = Comparison
Mathematics:	Experimental = Comparison

Regular students

Writing:	Experimental = Comparison
Reading:	Experimental > Comparison
Mathematics:	Experimental > Comparison

Affective Variables

A 2 (Group) x 2 (Student Type) MANCOVA performed on the global scores of affective tests revealed a significant effect for Group [F (5, 517) = 3.86, p < .01, Wilks's lambda = .96] .

Univariate tests on Group factor indicated that the difference is significant on attitude scores only:

Attitude	Experimental > Comparison
Self-concept	Experimental = Comparison
Locus of control	Experimental = Comparison
Loneliness	Experimental = Comparison

Sociometric scores were analyzed separately because the measure was taken at post-test only. The descriptive data show that at-risk students in the experimental

group (M = -0.21) obtained a higher sociometric score than the same type of students in the comparison group (M = -0.45). However, this superiority was not statistically significant.

LD Students

Academic scores

In spite of the fact that the experimental program was intended for students at educational risk, scores of LD students (identified by a MDT) were specifically analyzed because of the importance of this category in the literature and in schools.

The descriptive data show that (see table 2):

- The PIER gave higher achievement in mathematics and writing.
- Writing scores decreased at post-test in the comparison group: Pre-test (M = 58) vs Post-test (M = 51.9).

The ANCOVAs performed on academic scores revealed that LD students in PIER did not perform significantly better than those in the comparison group.

Affective variables

The same type of analysis (ANCOVAs) which compared the two groups of LD students on affective scores gave no significant effect on the perception of their abilities, on positive and negative locus of control and on loneliness.

A marginal effect was obtained on attitude toward school [F (1, 38) = 3.07, p < .08)]. LD students of the experimental group tended to have a more positive attitude toward school (M = 77.1) than LD students in the comparison group (M = 71.6). The effect size was +0.39 (see table 2).

A t-test comparing the two groups of LD students on sociometric scores gave again a marginal effect in favor of the experimental group, [t (57) = 1.87, p < .06)]. LD

students receiving pull-in services had a tendency to be more often chosen by their peers (M = -0.20) than those having attended a resource classroom (M = -0.54).

DISCUSSION

The results reveal that the experimental program is academically advantageous for both at-risk and regular students.

For at-risk students:

- PIER was at least as effective as activities conducted in the comparison class in reading and mathematics.
- PIER gave higher scores in writing.

For regular students:

- They are not retarded by the presence of at-risk students into the classroom.
- They benefit from the interventions provided in reading and mathematics.

For at-risk and regular students:

- Students in the experimental program developed a more positive attitude toward school than students having attended traditional classes in the comparison group.

As we tested a multicomponent treatment package, it is difficult to attribute its effects to a particular component. Nevertheless, the results give a certain support to the hypothesis that in-service special education gives better school performance for students at educational risk and regular ones.

The comparison with Stevens and Slavin's (1995) is particularly interesting because this is the only other research that used total inclusion in its experimental program. After one year of experimentation, the authors reported modest results. A clearly superior performance can be seen after the second year of experimentation: the experimental group is superior on four of the six academic measures.

We hypothesize that a longer period of implementation of PIER would give further improvement in the experimental group:

- One year may constitute a very short period of time to palliate difficulties often pertaining since the beginning of the school years.
- Teachers may need more than one year to master instructional skills required in PIER.
- Before the study, special teachers had very few experiences of collaboration with the regular teacher and of direct intervention in the classroom.
- Both types of teachers need to learn to work together.

LD Students

When considering LD students only, the PIER classes did not give higher academic scores than the comparison classes, but a tendency to have a more positive attitude toward school and to be more often chosen by their peers was observed in that group.

Overall, students identified as LD by a MDT did not deteriorate their performance in a pull-in service delivery in comparison to students receiving resource class services. Similar results are reported by Stevens and Slavin (1995) after having experimented one year of a total inclusion program. The second year, the benefit gained from cooperative classes for LD students was significant.

It is suggested that a pull-in service is necessary over more than one year to test the effect of the program with LD students. On the other hand, the necessity to maintain pull-out services with more severe cases has still to be evaluated.

LD students having received services in the regular class tend to be more often chosen by their peers for activities. This result supports the idea that inclusion favors

social relationship in LD students. However, after two years, Stevens and Slavin (1995) reported significant results for LD students on the social relations variable. We hypothesize that one year is too short to change the social status of a child into the classroom, even when no segregation is present and cooperative learning is frequent.

Finally, there is a tendency for LD students in PIER to have a better attitude toward school than those in the comparison group. It is difficult to determine if this effect is attributable to the type of service or to the enriched instruction provided in PIER.

MERITS OF THE STUDY

An original feature of this study is that the program was implemented in 13 classes located in 13 different schools. Other studies used entire schools and consequently a more limited number of schools.

In this study, we decided to control for the grade effect by selecting only one grade.

This procedure permitted special teachers to experiment the program with only one class, which was more realistic than changing their professional activities for the entire school.

As far as the school is concerned, restructuring was limited to one of its classes instead of all of them. This way of doing appeared justified in view of the limited empirical data supporting that type of program.

LIMITATIONS OF THIS STUDY

As the experimentation in this study was realized in real classrooms, it was not possible to control for all the experimental variables.

Random assignment to the group was made for special/regular teacher dyads, but not for students.

The participating teachers were volunteers. Consequently, they were not necessarily representative of the teachers' population.

The degree of implementation of the program was not controlled in this study. Some teachers were better at using the components of the program. The influence of that factor was not measured.

CONCLUSION

The results do not permit to conclude that PIER is clearly superior to the traditional model of instruction and services. Nevertheless, results obtained are promising and they indicate that PIER offers a valid alternative to the school system for service delivery to students at educational risk. It has the advantage of being helpful for regular students at the same time.

After one year of implementation, the efficacy of PIER seems as good as the other programs. However, more than one year would to be necessary to evaluate its effectiveness with more severe cases.

Research must continue to elucidate its convenience with these students or to improve the efficacy of this type of program with the lowest achievers in schools.

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Table 1

Means and Standard Deviation for Academic and Affective Scores by Group

	Experimental			Comparison			
	Pre-test	Post-test		Pre-test	Post-test		
	M (SD)	M (SD)	M adj.	M (SD)	M (SD)	M adj.	Size effect [1]
Reading							
At-risk	31.3 (21.8)	55.1 (14.9)	60.4 [a]	29.6 (17.1)	58.6 (17.0)	63.1 [b]	-0.16
Not at-risk	51.4 (19.8)	72.7 (15.1)	68.5 [c]	51.8 (19.6)	70.7 (14.5)	65.1 [d]	+0.23
Writing							
At-risk	51.1 (12.9)	56.1 (10.3)	61.8	59.7 (11.5)	53.1 (9.6)	56.0	+0.60
Not at-risk	63.8 (9.7)	66.8 (12.3)	63.5	68.1 (9.3)	68.2 (12.9)	62.9	+0.05
Mathematics							
At-risk	26.0 (13.7)	42.5 (15.5)	49.3	29.0 (14.3)	44.0 (14.5)	49.2	+0.01
Not at-risk	43.4 (15.6)	61.9 (14.6)	57.1	47.6 (15.8)	57.7 (14.9)	50.5	+0.44
Attitude							
At-risk	74.5 (12.6)	75.3 (11.1)	76.1	76.7 (11.2)	71.4 (12.7)	71.5	+0.36
Not at-risk	74.8 (10.8)	72.7 (11.4)	72.8	76.5 (9.8)	71.8 (11.2)	70.9	+0.17
Perception of ability							
At-risk	40.9 (8.8)	39.7 (9.8)	40.5	38.2 (10.6)	38.8 (9.0)	41.0	-0.06
Not at-risk	44.3 (8.4)	45.1 (8.9)	43.9	45.2 (9.0)	46.0 (7.2)	44.2	-0.04

(table continues)

	Experimental					Comparison					
	Pre-test		Post-test			Pre-test		Post-test			
	M	(SD)	M	(SD)	M adj.	M	(SD)	M	(SD)	M adj.	Size effect [1]
Locus +											
At-risk	6.7	(1.8)	7.0	(1.7)	7.2	6.7	(2.0)	7.1	(4.5)	7.2	0
Not at-risk	7.6	(1.7)	7.2	(1.7)	7.0	7.7	(1.9)	7.3	(1.7)	7.1	-0.06
Locus -											
At-risk	5.5	(2.5)	5.8	(2.6)	6.1	5.8	(2.7)	6.4	(4.2)	6.5	-0.10
Not at-risk	5.8	(2.5)	6.4	(2.4)	6.3	6.1	(2.5)	6.8	(2.5)	6.5	-0.08
Loneliness											
At-risk	26.5	(8.9)	25.8	(8.7)	24.8	26.8	(9.3)	26.6	(8.9)	25.5	-0.08
Not at-risk	23.6	(6.6)	23.2	(7.3)	24.2	23.4	(7.4)	23.3	(8.2)	24.5	-0.04
Sociometric Z scores											
At-risk			-0.21	(0.9)				-0.45	(0.7)		+0.34
Not at-risk			0.14	(1.0)				0.11	(1.1)		+0.03

Note. [a] (n = 79). [b] (n = 86). [c] (n = 209). [d] (n = 232).

[1] Size effect equals the difference in adjusted means divided by the control standard deviation.

Table 2

Means and Standard Deviation of LD Students for Academic and Affective Scores by Group

	Experimental (N = 27)			Comparison (N = 32)			
	Pre-test	Post-test		Pre-test	Post-test		
	M (SD)	M (SD)	M adj.	M (SD)	M (SD)	M adj.	Size effect [1]
Reading	34.9 (25.3)	56.7 (16.3)	55.8	28.9 (15.9)	55.7 (17.9)	56.5	-0.04
Writing	49.9 (11.7)	55.5 (11.0)	56.3	58.0 (10.4)	51.9 (10.3)	51.1	+0.50
Mathematics	28.1 (14.1)	40.3 (16.9)	40.0	29.0 (11.0)	38.3 (11.0)	38.6	+0.13
Attitude	74.8 (9.8)	76.5 (9.1)	77.1	78.1 (11.0)	72.2 (14.0)	71.6	+0.39
Perception of ability	42.0 (6.9)	39.5 (8.7)	38.7	38.3 (10.8)	39.0 (9.7)	39.9	-0.12
Locus +	6.8 (1.7)	6.5 (1.8)	6.5	6.0 (2.0)	6.4 (1.3)	6.5	0
Locus -	5.6 (2.4)	6.1 (2.2)	6.1	6.0 (2.7)	6.0 (2.2)	6.0	+0.05
Loneliness	25.7 (7.3)	25.8 (8.7)	26.7	27.4 (9.0)	26.2 (10.4)	25.3	+0.13
Sociometric Z scores		-0.20 (0.8)			-0.54 (0.6)		+0.57

Note. [1] Size effect equals the difference in adjusted means divided by the control standard deviation.

P. I. E. R.

Figure 1